

CLAIMS

1. A system (SC) for controlling the climate in an environment, including  
a first, vapour compression circuit (A), including a compressor (1) the output of which is connected to a condenser (2; 2') followed by an expansion device (4) and an evaporator (5; 16) the output of which is connected to the intake of the compressor (1);

a second, absorption circuit (B) which, in operation, has a hygroscopic solution flowing through it and includes a semipermeable-membrane regenerator (11) operable to allow the said solution to give up moisture (water) to a first airflow flowing in the regenerator (11) during operation, a dehumidifier with semipermeable membranes (13), arranged downstream of the regenerator (11) and operable to allow moisture to pass from a second airflow to the hygroscopic solution, and a circulation pump (14);

the first and the second circuits (A, B) being connected by at least one heat exchanger (5) in which the hygroscopic solution flowing through the second circuit (B) give up heat to the cooling fluid flowing through the first circuit (A).

2. A system according to Claim 1, in which the said heat exchange (5) acts as evaporator in the aforesaid first circuit (A).

3. A system according to Claim 1 or Claim 2, in which the regenerator (11) of the second circuit (B) is arranged near the condenser (2) of the first circuit (A), and a fan (6) is provided to generate a flow of air first into the condenser (2) and then into the regenerator (11).
4. A system according to any of the preceding Claims, for the climate control of the passenger compartment of a vehicle with an internal combustion engine with a cooling circuit associated therewith;  
a liquid/liquid heat exchanger (see Figure 1; 15) being interposed between the dehumidifier (13) and the regenerator (11) in the second circuit (B) for causing the cooling liquid of the engine to give up heat to the hygroscopic solution flowing through the said second circuit (B).
5. A climate control system according to Claim 1 or Claim 2, in which the first and the second circuits (A, B) are connected by an additional heat exchanger (2') in which the fluid flowing through the first circuit (A) gives up heat to the fluid flowing through the second circuit (B).
6. A climate control system according to Claim 5, in which the said additional heat exchanger (2') is arranged in the first circuit (A) between the compressor (1) and the expansion device (4), and in the second circuit (B) is arranged between the output of the

dehumidifier (13) and the intake of the regenerator (11).

7. A climate control system according to Claim 5 or Claim 6, in which the second circuit (B) includes two sub-circuits in which respective pumps generate respective flows of hygroscopic solution, with different volumes respectively, from a common tank (12) towards the regenerator (11) and the dehumidifier (13) respectively; the flows of hygroscopic solution coming from the regenerator (11) and the dehumidifier (13) respectively being returned to the said tank (12).

8. A climate control system according to Claim 5, in which the said additional heat exchanger (2') is arranged upstream or downstream of the condenser (2).

9. A climate control system according to Claim 5 or Claim 8, in which the first circuit (A) includes an evaporator (16) arranged downstream of the said first heat exchanger (5) which connects the first and second circuits (A, B); the said evaporator (16) being arranged near the dehumidifier (13) of the second circuit (B), downstream thereof along the direction of the aforesaid second airflow which flows into the said dehumidifier (13) in operation.